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ABSTRACT

Learning characteristics of children with spina bifida (lesions on the spinal cord) are reviewed in the text of a presentation with slides, and the effects of such factors as hospitalization experiences and the presence of hydrocephalus are considered. Characteristics related to intelligence, sensory integration, tactile responsiveness, tactile defensiveness, motor planning, postural insecurity, visual perception problems, handwriting problems, distractibility, language style, and reading are discussed; and examples of students with those characteristics are given. Suggestions for remediation are offered. Also included in the paper are guidelines regarding adaptations for physical problems, and several bibliographies on the topic. (CL)

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THE SPINA BIFIDA CHILD IN THE CLASSROOM

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Meeting the Multiple Needs of

Spina Bifida Children

by
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Marita vanderHave, OTR

Introduction

In this presentation we hope to give you some general descriptions of the learning characteristics of children with meningomyelocele and how their particular learning needs and learning styles can be met in the classroom. Of course, each child you meet must be dealt with individually as the multiple factors will make each child's case unique and his program unique.

1st slide - Bev

In the case of meningomyelocele, there are three important aspects of their handicap which we must consider as having a profound influence on the child's ability to learn: 1) the level of the meningomyelocele on the spinal cord; 2) the presence of hydrocephalus and possible shunt; 3) the hospitalization experiences of the child.

2nd slide First, the level of the lesion will have a direct influence on the following: the child's ability to ambulate, the likelihood of hydrocephalus, incontinence, sensory capabilities, intellectual ability, as well as educational performance.

3rd slide

The more physically handicapped the child, the more likelihood the presence of mental retardation and/or learning problems.

The second major factor is the presence of hydrocephalus. Up to 80-95% of children with meningomyelocele have hydrocephalus. With many children shunts are required to drain the excessive cerebrospinal fluid.

4th slide

Any professional involved with spina bifida children should be knowledgeable of the signs of possible shunt failure as listed here on the slide.

In addition, professionals should know the types of medications the child may be taking and their possible side effects. The primary reason for drug therapy is usually due to seizures or urinary problems.

The third major factor is the effects of prolonged and/or multiple hospitalizations. Shepherd (1969) found that children with chronic illnesses have reduced opportunities to develop adequate visual-motor preception and sensory integration which may affect a child's educational performance. Soare and Raimondi (1977) found the degree of perceptual-motor difficulties was directly related to the time spent during the first five years of life in the hospital.

Intelligence

(5th slide)

The intellectual level of children with meningomylocele will vary; the higher the level of the lesion on the spinal cord, the more physically handicapped the child and the higher the incidence of mental retardation. The higher the level of the lesion, the greater the likelihood of the presence of hydrocephalus. The least affected areas on IQ tests are: short term memory, vocabulary, and general

knowledge. The most affected test areas include those requiring: eye hand coordination, hand speed, comprehension, arithmetic, and visual perception.

Sensory Intergration

(2 slides - 1 for one projector and one for the other) - Bev

Laterality: Many children have not established or have a late establishment of hand dominance (usually around 8 years of age). Dominance refers to the preferred use in better performance of one side of the body over the other. Without this establishment, competing motor tendencies develop that in turn produce inconsistent eye movements and confused visual perception. We know that consistent hand and eye preference can affect academic skills as well.

Carol: When dominance is not established, children have a difficult time in first grade classes, where many paper and pencil tasks are required.

(Slide of JoVon)

JoVon is an unusual spina bifida child as she has a good grasp, good left to right sequences, can cross the midline of her body, with no problem and has good visual tracking.

Slide Paul: More typical of meningomyelocele children, this child has not established hand dominance and he switches hands constantly working on the left side of the paper with his left hand and right side of the paper with his right hand. Here, he is presented chalk at the midline and grasps the chalk with his right hand.

Slide II Paul: Here he begins to switch hands when presented with locating the proper choice on the top row, which comes on the left of his board.

Slide III Paul: Here he circles the choice on the left side of his body with the left hand and Slide IV Paul: He switches back to the right hand for the proper choice on the left side of board. When these children are place in first grade before dominance is established, they often become left handed children, because writing begins on the left and they are often discouraged from changing hands. It is better to avoid paper and pencil tasks until dominance is established.

Marita: (Slide) The Occupational Therapist can assist in determining dominance. This slide shows part of the Southern California Sensory Integration Tests (SCSIT). It is called "Motor Accuracy" and is a motor task that requires the child to draw a line with a pencil over the dark printed line. He uses first his preferred hand to trace, then his other hand. The accuracy scores of the two hands are compared to determine which had he is using better. This test, as wall as observations of the child's hand use during other activities, can help us to determine dominance.

Marita: (Slide Paul, rope) This activity might be used to encourage the child to use both sides of his body.

Marita: (slide: clothespins) This activity requires that he choose one hand over the other to remove the clothespins. It is activities like this that help us to determine which hand he uses better.

Carol: Hand weakness is also a major problem for meningomylocele children in the classroom. SLIDE: (Mikey) This child's hands are pudgy, undeveloped, and very

weak, and this is typical of these children. Because of the weakness and possible tremor, grasping objects may be very difficult. In using crayons or pencils, the weakness causes problems; so often marking pens may be substituted while hand weakness exists.

Slide: (Mikey clapping) Coordinated hand movements such as clapping are also very difficult. There are hundreds of activities we encourage in the classroom to help develop hand strength. SLIDE: Play activities are very good. SLIDE: These Tupperware pull-apart animals are very difficult to disassemble and are good for hand strength. SLIDE: Pop beads offer resistance when pulled apart and are good as are numerous other manipulative toys which are highly motivating for young children. SLIDE: (Scooting) Children are also encouraged to build hand strength by moving thmeselves about the classrooms in this manner, pushing with their hands for short distances. SLIDE: (rope) This rope activity is excellent for hand and arm strength. SLIDE: These children with very weak hands, as we have said, may have a great deal of difficulty in paper and pencil tasks which may cause a great deal of anxiety. It is very important to provide ample manipulative activities prior to writing.

Marita: (Story of Diana) I want to tell you a story about Diana. She was a 6 1/2 year old meningomyelocele child with a normal IQ and certainly a 6 1/2 year old should be able to write. But when I put a pencil in her hand she started to cry. The next time, she arrived in O.T. pushed by the physical therapist, her hands were tied in a necktie. She explained that she had asked the P.T. to tie her hands so that she did not have to write. She was telling me very graphically that she was not ready to write, regardless of her age or I.Q. So we started playing with some manipulative and fine motor activities which she loved. The next time I put a pencil in her hand which was several months later she was delighted.

SLIDE: Tactile Responsiveness

BEV: Because of poor kinesthetic and tactile feedback, many children may have difficulty with motor planning and organizing their movements in space. Through kinesthesia we can estimate the amount of muscle movement required to carry out a task, but children with spina bifida may have problems in tactile and kinesthetic processing which can contribute to motor planning problems.

Marita: (O.T. Testing) In Occupational Therapy we adminster tactile and Kinesthesia tests as part of the SCSIT.

SLIDE: Finger Identification: This slide shows finger identificaton: The child points to the finger on his hand which was previously touched by the examiner without the child watching. We find that many meningomyelocele children cannot differentiate well between their fingers.

SLIDE: Kinesthesia: This slide shows the "Kinesthesia" test. With vision occluded, the child attempts to place his finger on a point at which his finger previously had been placed by the examiner.

Tactile Defensiveness: Marita (SLIDE: Child with fingerpaint)

Some children are tactilly defensive with an aversion to being touched. During testing one may see the child vigorously attempting to wipe away the test stimulus. This aversion to touch may decrease a child's participation in tactile experiences. SLIDE: Mickey (Fingerpaint) This child does not like to feeling of the sticky substance so we have to encourage the children to become gradually involved in tactile experiences.

Carol: SLIDE (Rolling) Activities we do that help increase tactile responsiveness include rolling in barrels in motor development class, SLIDE (Sponge paint) Sponge painting, sand and water play are also good for tactile input. SLIDE: This is fingerpainting with chocolate pudding - a trace and lick exercise. SLIDE: Using stencils for tracing is being done here to increase tactile and kinesthetic input. SLIDE: Tracing bean or sandpaper letters is also very helpful. SLIDE: This letter is being traced over screen wire. SLIDE: and this one traced over clear acetate, all providing increased tactile input to faciliate learning. SLIDE: Scrubbing with texture or rug squares often precedes manipulative activities.

Motor Planning

Marita: (SLIDE: Imitation of Postures)
The O.T. as part of the SCSIT is doing "Imitation of Postures". The child is required to assume a series of postures or positons demonstrated by the examiner, a process that requires motor planning. The positions must be assumed by the examiner very quickly so that the child cannot see how to move into the position, but rather must figure this out for himself. Many meningomyelocele children find this difficult.

CAROL: SLIDE: Finger play

Problems isolating finger movements are common with children who have motor planning problems and finger plays in the classrooms are excellent for working on this problem. SLIDE: Simon Says is another fun way to work on imitation of postures and finger movements. SLIDE: Cutting also requires intricate motor

planning skills and good hand use and is often difficult for meningomyelocele children. SLIDE: Here the child is having great difficulty motor planning the cutting of the far side of the paper. SLIDE: This child was asked to remove his jacket and as you can see he pulls the sleeve up instead of off, another example of poor motor planning on self help tasks.

POSTURAL INSECURITY Carol: SLIDE: Postural insecurity is a problem we often see with meningomyelocele children in school. SLIDE: This child is very insecure with this air mattress activity enjoyed by other children. SLIDE: Again on his back he is very fearful even with adult support. One ambulatory spina bifida child in our school was successfully mainstreamed into the regular first grade physical education class until a unit on tumbling was introduced. He was not willing to participate even with teacher support. SLIDE: Inverted positions are especially threatening to many children. We encourage movement experience with activities. SLIDE: Rocking, experiences rolling over a large ball, and swimming are especially helpful in working on position changes. SLIDE: We have observed that most of our meningomyelocele children with hydrocephalus react to loud sounds in this manner, usually holding their hands over their ears, and are often very fearful even when prepared for the noise, such as fire drills or school bells.

Visual Perceptual Problems

Bev: The problems in visual perception exhibited by these children may be the result of a number of factors: poor eye muscle control problems in eye tracking, the result of brain damage, correlations with higher level lesions, hydrocephalus, and their experiences in hospitals. The average delay documented in research is from 1 1/2 to 2 1/2 years. Children of meningomyelocele have particular areas of difficulty in: SLIDE

1) spatial discrimination-- the ability to appreciate or judge distances and directionality and organize a sequence of movements.

2) figure ground or the inability to distinguish between the aspects of a stimulus and ignore the irrelevant aspects. Frequent complaints from teachers include: he never finishes his work, he has difficulty keeping his place, he often skips sections and general disorganization.

3) Visual tracking is also another difficulty.

Marita: SLIDE: Space Visualizations)

The O.T. adminsters several tests as part of the SCSIT which measures visual perception. This is "Space Visualization". Form boards are used to involve visual perception of form and space and mental manipulation of objects in space. Meningomyelocele children often have problems with mental rotation of figures. This test is also helpful in determining dominance as the child must choose one hand or the other or both.

Marita: SLIDE: Design Copying)

This is "Design Copying", a visual-motor task which involves duplicating a design on a dot grid. A child is often unable to copy a design accurately. SLIDE: Figure-Ground Perception: This is a sample from the "Figure-ground Perception" Test. Stimulus figures are superimposed and imbedded to require selection of a foreground figure from a rival background. Many of the children have a great deal of trouble with figure-ground discrimination. You may see some attempts at visual compensation especially head movements to help eye scanning and picking out foreground from background; now thats not to be confused with head shaking which is often related to increased intercranial pressure.

Marita: The O.T. does eye tracking testing as part of the clinical evaluation. This boy is following an object with his eyes but not moving his head. Meningomyelocele children often have problems with tracking in the horizontal and vertical planes and crossing the midline as well. You may see evidence of nystagmus or eye jerking movements in the peripheral ranges. This is very relevant when they start to read.

CAROL: Slide of Jeff: In the classroom many of these children do exhibit eye tracking problems and have difficulty keeping their place in reading, copying from the chalk board or copying from a book. SLIDE: In working on eye tracking, sequences of visual tracking group games may be done in the classroom to help: tracking objects, colors, shapes. SLIDE: tracking pictures, letters, words. SLIDE: Children who continue to have eye tracking as they read are taught to us various types of markers to keep their place. SLIDE: Other children may find finger pointing is necessary in order to follow reading. SLIDE: This technique of writing sentences on the chalk board with different color chalk for each line is very helpful to some of our children who have eye tracking problems. SLIDE: On worksheets again various colors may be used on each line in preparing the worksheet.

CAROL: Another area of difficulty is in the formation and size of letters. SLIDE: This paper is very typical of an 8 year old meningomyelocele child. SLIDE: Modifications in handwriting papers using colored lines gives needed support for many children who exhibit problems in letter size and formation. SLIDE: Another technique that is helpful is for the child to trace a teacher made model on each line before reproducing his own. SLIDE: Worksheets such as this one even though made larger and darker may still be visually confusing and (SLIDE) simply cutting

the sheet in half and presenting one half may make the work more visually appropriate for the child. SLIDE: These Math Steps are helpful to give a more visually clear and concrete picture to the child who has difficulty with abstract math concepts as well as visual perceptual problems. SLIDE: Reading worksheets can be made individually to be larger and more clear for children with visual perceptual problems as well.

Visual-Motor ---Handwriting Problems (Slides on both projectors)

BEV: When a child writes he must accurately perceive the forms of the letters, organize his sensory input and motor response, and control his arm and hand movements. We know he needs information from his visual, tactile and kinesthetic systems. Over 40 muscles are used in handwriting and visual feedback can play an improtant role in controlling motor movement. If delayed even 1/2 second the handwriting can deteriorate. Children with meningomyelocele have been observed to have an awkward pencil grasp: (SLIDE) Immature, too tight, with problems controlling the forcefulness of the movements of the pencil and its speed.

SLIDE: Some children may bear down so hard on the pencil that they will tear through the paper and usually the handwriting rate is much slower -- in one study children with meningomyelocele were comparable to the speed of a child 2 years younger in chronological age. The Letters are often characteristic of ataxia and tremor. The alignment and spacing of letters and words are difficult for them as well becuase of spatial perception problems.

ORGANIZATION: (Slides on two projectors)

CAROL: Many meningomyelocele children have difficulty with all types of organizational tasks. The disorganization includes the expression of their own

thoughts, organization of their own belongings, and organization of their work on paper.

SLIDE: The desk area of this child mainstreamed in a 4th grade class often looks very disorganized, and we have been working with her and many other children on learning assistance for organization of their own belongings in work areas. We find that once a system for organization is learned, these children may have difficulty in transferring that organizational skill to a new situation. For instance, one child needed a great deal of assistance in learning a system for organizing her personal belongings in the bathroom for the catheterization process. She did learn the system and used it consistently; however, when a different bathroom in the school was used, she had difficulty transferring the system. Therefore, when the environment changes for these children, problems may require constant monitoring. SLIDE: Here for the same child a pocket was placed on the side of her table, to assist her in organizing papers and books. SLIDE: This child who did this paper is 10 years old and as you can see has great difficulty with organization, visual perception and eye tracking. He was asked to fold the paper in the center and number 1-15 on the left and number 16-30 at the centerfold and to begin to number below the heading. He had great difficulty in all of the areas I mentioned. SLIDE: He is working on learning to centerfold his paper to assist him in his regular education class where he needs these skills in daily situations. Learning organizational procedures such as center folding the paper is very helpful to many of our children. SLIDE: This child is using a marker placed on his reading book to assist him in copying answers from his book to his reading follow-up paper. I should mention here too that these children need a structured orientation to their paper task--wheel chair locked, chair facing squarely to the table, and the children must learn to utilize these helpful techniques on their own, so that they may be more successful in regular education

classes. SLIDE: (Chris) Many meningomyelocele children tend to be unaware also of body or foot position and their organization of their paper work is influenced by poor positioning, but (SLIDE) when reminded paper work improves with better orientation. SLIDE: (Bobby) Children with hydrocephalus often assume this headdown type of position in writing, which creates more problems in letter size and formation, as well as in paper organization. SLIDE: Here writing improves with proper positioning. SLIDE: (Dwight) This child has a severe lordosis and he tends to wrap his legs around the chair and hook one arm over the back of the chair as he works, his way of trying to build in some stability for himself perhaps. SLIDE: Appropriate seating helps his organization and of course this seating much better meets his physical needs. SLIDE: Many meningomyelocele children are not aware of their body position in relation to placement of their work, and may approach their work in a position such as this. SLIDE: They must be taught to properly orient themselves to their work, and the work process must be constantly monitored until this is consistent.

DISTRACTABILITY: (Two projectors)

CAROL: Another major area that causes problems in the school setting is distractability. Often these children are described as "spacy" or "tuned out". They often make inappropriate responses and attend to irrelevant stimuli. In the classroom they work slowly and tend to forget the tasks at hand. SLIDE: This child often tunes out a group activity and tunes into his own world, making finger movements and noises unrelated to his surroundings. It is difficult to get his attention when this tuning out occurs. SLIDE: When he walks, he may become distracted and forget to walk, so moving from place to another in the school requires a great deal of reorientation to the task. SLIDE: With these children who are distractable in the classrooms, it is helpful to reduce visual distractors as

much as possible, by trying to place children away from doorways or distracting areas or by using screens as here to eliminate distractions of nearby children. SLIDE: Becuase these children require constant redirection of the learning task due to the distractibilty factor, one to one instruction is very helpful for optimal learning. SLIDE: Here, children from regular education classes are tutoring to provide addititonal one to one instruction with the distractable meningomyelocele child.

LANGUAGE (Slides on both projectors)

BEV: Many children with meningomyelocele and hydrocephalus have a rather particular style in their use of language. They often have been described as having a "cocktail Personality" where there is an endless flow of well constructed sentences which are often inappropriate, repetitive or meaningless. The children can be quite talkative and personable which often camouflages their weaknesses and gives the impression of being very cute, bright and witty. Often many professionals may make wrong assumptions about the children based on the conversational level alone or develop unrealistic expectations assuming the child has progressed farther than he actually has.

That is not say that they do not have strengths in language skills; they certainly do, particularly in the area of vocabulary, picuture vocabulary, and a striking ability to memorize rhymes, songs and stories. They certainly will often initiate more speeches and use more words than many other children and this can be used to an advantage. But one must also examine their language skills closely as you may find only a superficial command of language.

They may have particular weaknesses in the following areas: 1) poor auditory decoding and auditory association --- e.g. I asked a child the question "What is a donkey?" the answer I recieved: "A thing that goes quack, quack. She heard the d and k and thought I said duck, so they often may misinterpret what is being said or misread directions or words.

MARITA: (Two slides with examples)

We keep a record of some of the words that our children have used. I wanted to share a few of these with you as sometimes they will make up words. For example they wrote: (1) gam as in gamaling, "My daddy goes gamaling"; (2) bap, as in bapire, "He bits your neck"; (3) bod, "My daddy's bod he has no hair." Sometimes they misinterpret real words: (1) a "pod", as in "Apod, Apod", applause: (2) Shall as in "My mom lets me take a shall at night"; (3) hint as in "When we go camping my dad puts up a hint".

BEV: (2) Use of more inappropriate and bizarre language -- particularly observable in younger children. To one older child I asked the question: "Who wrote Romeo and Juliet?" Answer: God is daddy. In many instances the child is unable to stay on a specific topic and will engage in a social conversation centering around his own personal experience, associations or what is currently happening in the situation. Other observers have noted echolalia, perseveration, and totally ambiguous and/or unrelated statements in their responses. Many childre will attempt to distract you from a required task by maintaining the flow of conversation. Often when the child doesn't know the answer or is in a stressful situation he will make irrelevant guesses or remarks.

BEV: 3) Problems with reasoning and comprehension ---Many children have particular difficulty in relating words in a meaningful way such as completing sentences on the ITPA using abstract concepts. They often remain very concrete in their thinking -- e.g. defining words or objects by their physical properties rather than by class or conceptual similarities or differences.

READING: (New slide)

BEV: Little research has been done on the reading capabilities of meningomyelocele children except to document a lag on the average of 18-30 months below their chronological age, particulary in the areas of content and comprehension. In one study, 2/3 of the 7 year olds could not even read a 3 letter word. Their reading problems may be due to a number of factors: poor intersensory integration, poor visual decoding and visual auditory association, conceptual level, poor ability to associate experiences with past experiences and/or language ability. But it is interesting to note that in England where 50% of children with meningomyelocele are mainstreamed in regular education schools, the children have a specialized educational program where reading and writing are really not introduced until they aer 8 years of age or older. The earlier years are focused on developing readiness skills.

Reading requires all of the brain's functioning --- sensory, motor, motivation, attention, expectancy, and cognitive abilities, and specialized programs may need to be developed to meet their particular learning style. At C.T. Reed an intensive multisensory approach to reading has been developed and Marita is now going to describe the program.

MARITA: Description of Program

How did the Occupational Therapist become involved in a reading program? Several years ago we were approached by a teacher for help. He had a 9 year old meningomyelocele child who could not read well or write legibly, yet his I.Q was high average. He proved to have many of the problems that we have talked about. What could we do? We did a lot of reading and talking especially to resource people in Prince George's County and began a reading and writing program which has been changed and adapted many times. We like to call it a multisensory approach and the program works. The reason it works is that it is daily, repititious and extremely structured. We have found it necessary to teach the children organization by rote; by having them do it over and over again. We have found that this rote, structured approac' to learning works well with meningomyelocele children. I want to stress I that this program is used as a temporary, intensive addition to the classroom program. It should be taught using a linguistic, perferably phonetic reading series such as, Palo Alto or Educator's Publishing Series. Our teachers are now using Merrill. A multi-sensory approach as the name indicates uses visual, auditory, tactile and motor channels at the same time. The program works best for children with near normal intelligence although we have used it with children testing in the 60's I.Q. range with success. We begin a child in the program when his hand dominance has been established or at least when we know which of his hands performs better for fine motor task. I stress real dominance and not habitual left handedness acquired from writing too early. We begin the program when the meningomyelocele child is about 7 or 8 years old.

Our multisensory approach to give proper credit, comes from Slingerland, Gillingham, the Specific Language and Reading Disabilities approach (SLRD) developed by Prince Georges County, Maryland for learning disabled children and from Merrill reading series. In the first phase of the program we teach the letters of the alphabet, then we start writing and learning letter sounds.

SLIDE: (Letter a): We begin by writing the letter 'a' on a large chalkboard. We teach the children to chant as we write the letter: "This is the letter 'a' and the sound is 'ae'." Our meningomyelocele children are very good at this chant because of the strong auditory channel. They then write the letter in the air saying the chant as they make the letter. I ask them to follow my hand motions as I form the letter. We help them with the motion until they get it. It often takes a long time to learn the motion if they have motor planning problems.

SLIDE: They then put the letter on their own chalkboard oriented to a line which we draw on their board. The trace it over and over saying the chant each time.

SLIDE: We do it with them until they are able to do it with no help.

SLIDE: They move to smaller sized letters still on the chalkboard and note the letter oriented to the line.

SLIDE: We introduce three lines on the chalkboard and discuss the size of the letter, how to use the lines, and where to start.

SLIDE: They have three lines on their own chalkboard onto which they must properly place their letter.

SLIDE: They then move to paper with bold lines. We must orient them to paper; where to start, how to use the lines, how to move from left to right, how to move to the second line.

SLIDE: Then use paper with smaller spaced lines.

SLIDES: They move to a paper with more lines with which they stay throughout the program.

SLIDE: I want to stress the importance of close supervision. We work with a small group of children with two adults, one at the chalkboard and one monitoring their work. We must be very careful because they readily give themselves incorrect feedback and will reinforce the mistakes because of he repetitiveness of the program. Hopefully the monitoring person can also keep them sitting to provide optimum visual input and good stability for good writing.

SLIDE: You see what can happen and the positions they can assume. It is certainly not a good combination of stability and good visual input, both of which we need to optimize.

SLIDE: They do better with their feet on the floor, body aligned, arms supported on the table and a good paper angle. Be sure they are holding pencils correctly, that they start in the right place, form letters correctly, move to the next line in the correct direction and leave adequate spacing. This little girl is doing nicely.

SLIDE: The children may have difficulties with spacing. This child puts a finger between words to help him with spacing.

SLIDE: This child has forgotten his left to right procedure on the second line and we did not catch him in time. He has poor spatial skills and motor planning. He

has formed his e incorrectly. This must be corrected immediately as he may reinforce the incorrect formation.

SLIDE: We teach the children to use flowing manuscripts, i.e., forming the letters in as continuous a motion as possible. Note how the letters are formed. Flowing manuscript helps to eliminate reversals and makes the transition of cursive easier.

SLIDE: All the capital letters start on the top line.

SLIDE: The sequence of introducing the letters depends upon which reading series you use. After the child has learned the letter "a" we introduce a few consonants. They learn them using the same technique you have seen, starting in the air, moving to the chalkboard. "This is the letter 'c' and the sound is (c). It is important to learn consonant sounds in isolation to produce an accurate sound (c) not cuh, (t) not tuh, (r) not er.

SLIDE: We then introduce them to sound blending consonant-vowel-consonat words to get auditory closure. It may take a long time to learn to blend isolated sounds into a word and then to hear the word they have said.

SLIDE: When they sound out a few words we put them into a book. This is the first book of the Educator's Publishing Series. Our teachers now use the Merrill series. Their initial attempts sound like: (t) ae If they forget the sound the review the chant. The don't yet have the sills to read "the", "is" or "a" so we tell them these words at the beginning. We then move on to cover other short vowels and consonants which are covered in a series of 10 books.

SLIDE: Even at this early stage with only a few lines on the page we may see evidence of eye tracking problems which may show up as missed words, skipping lines, and repeating. We have to introduce aids for reading. They may need only a finger to guide them, or they may need a ruler, cut out paper or some of the highlighting procedures you saw earlier.

SLIDE: Highlighting

SLIDE: The next series of books that the children read involves memorizing rules for reading. The learn "magic e", dipthongs, blends and special combinations, e.g.: th, ch, oy, ing.

SLIDE: This book shows the addition of the "magic e" to the stories and the short vowels and consonants.

SLIDE: We give our meningomyelocele chidlren daily intensive work in this group in addition to their classwork until they are competent enough to read and write this, which is mid-first grade level. Although we will often discontinue the O.T. group, we often find that the teachers ask us to continue it because of the children's progress. We feel that they must reach a point where the very intensive drill is no longer necessary.

SLIDE: The next year if they are eight or nine they will probably more easily fit into cursive. How do we know if they are ready for cursive? As an evaluation tool, we use the Purdue-Kephart motifs on the blackboard. I write a motif on the chalkboard as the child watches me. He then tries to duplicate it, the form as well as the rhythm and smoothness.

SLIDE: Even at this early stage with only a few lines on the page we may see evidence of eye tracking problems which may show up as missed words, skipping lines, and repeating. We have to introduce aids for reading. They may need only a finger to guide them, or they may need a ruler, cut out paper or some of the highlighting procedures you saw earlier.

SLIDE: Highlighting

SLIDE: The next series of books that the children read involves memorizing rules for reading. The learn "magic e", dipthongs, blends and special combinations, e.g.: th, ch, oy, ing.

SLIDE: This book shows the addition of the "magic e" to the stories and the short vowels and consonants.

SLIDE: We give our meningomyelocele chidlren daily intensive work in this group in addition to their classwork until they are competent enough to read and write this, which is mid-first grade level. Although we will often discontinue the O.T. group, we often find that the teachers ask us to continue it because of the children's progress. We feel that they must reach a point where the very intensive drill is no longer necessary.

SLIDE: The next year if they are eight or nine they will probably more easily fit into cursive. How do we know if they are ready for cursive? As an evaluation tool, we use the Purdue-Kephart motifs on the blackboard. I write a motif on the chalkboard as the child watches me. He then tries to duplicate it, the form as well as the rhythm and smoothness.

SLIDE: This child is obviously not ready. She cannot duplicate the form or the movement.

SLIDE: This little boy is ready. He has a mistake on the 'm' but it is a generally good reproduction. He executes it smoothly and with little hesitation. In fact he is doing very well in cursive.

SLIDE: We like to use the Gillingham form of teaching cursive which has all the lower case letters beginning on the bottom line. It provides a consistant starting point, and makes the attachment of the letters quite easy, a, c, d.

SLIDE: This program has the child writing the letters on the chalkboard, the chalk gives the letters a nice flowing movement. He uses a Magic Marker as opposed to a pencil for a nice flowing movement as well.

When we start our multisensory program with our older meningomyelocele children who cannot read or write well, we may start them in cursive and skip printing altogether. Often their printing is poor and they have been reinforcing mistakes for years. This is a good way to start from scratch. We find cursive to be very self motivating in a child who is ready because they love to write like an adult.

BEV: Although we have attempted to give you an overview of learning problems which may be exhibited by meningomyelocele children we again want to emphasize each child must be approached as an individual. Because there are so many variables to consider in programming for a child with meningomyelocele, we hope we have demonstrated to you the importance and the need of a Transdisciplinary Approach which brings the expertise of many professionals into an integrated educational program.

ADAPTATIONS FOR PHYSICAL PROBLEMS OF SPINA BIFIDA CHILDREN

By

Carolyn Lindsey, M.A.
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EC 140353

Narrative	Slide
Spina Bifida is the name for a congential malformation of the spinal cord, the immediate coverings of the cord, and the backbone around it. This defect occurs during the early stages of fetal development and affects children in from one to four per thousand births.	
Although our knowledge of the costs of Spina Bifida is by know means complete there are a number of established facts there is no evidence that taking any drug or any item of diet (and that includes potatoes) in pregnancy has any bearing on the problem or that the age of the parents has any important influence or that either injury or illness during pregnancy causes or contributes to the development of these defects.	
There is strong evidence that the condition often recurrs in families. Also we know that there is considerable variation in the incidence of spina bifida in different countries and that there are differences within each country depending on race and perhaps other factors we know that the incidence of spina bifida is more common during economical depressions in war than it is during prosperity in peach it is much commoner among the poor members of the community although the rich and the well educated are not exempt from this risk either.	
There are several different types of Spina Bifida. The term Spina Bifida embraces a group of developmental defects of the spinal column ranging from a condition called spina bifida occulta which is fairly common but usually has no effect on function to the far more complex and serious conditions which the term spina bifida has come to mean the most of the public that is myelomeningocele. Myelomeningocele is the form of spina bifida for which the most help is needed	
When a baby is born with spina bifida the sac or seal is usually repaired by surgery shortly after birth this results in a scar with little discoloration which you may have noticed already.	

Narrative	Slide

curb cuts

railings

sometimes they have a nice touch. This one has sunken bolts so that hands on wheelchair wheels won't be hurt

ramps in hallways

sometimes half the stair area is ramped; sometimes if the hall is narrow, the entire area is ramped. In order to help the steepness level at the recommended 1 vertical inch to 1'2 horizonal inches, the ramp may have to begin before the original steps and end after the steps end

other adaptations include water fountains accessible to wheelchairs,
wide doors
sinks, hopefully with hot water pipes covered

toilets with a variety of bars and height adaptations

and use of a lift for heavier students who are unable to transfer from a wheelchair to the toilet

Some children with SB can ride a regular school bus even if they are in a wheelchair

P.E. can be adapted by changing equipment or game rules

All classroom materials can be made accessible.

Skin Insensitivity is another possible problem. In those parts of the leg which are paralysed, there is often a lack of feeling. He cannot feel pain, discomfort, heat or cold. He is not aware of pressure. He may have poor blood supply to his legs

This may result in areas where skin breakdown, or decubitus ulcers occur

You will want to make sure he stays warm outside, stays away from radiators

and does what it called "wheelchair pushups" in order to relieve pressure areas on the buttocks

Narrative	Slide
The severity of the problems related to spina bifida is a very individual matter. The level where the lesion or defect occurs on the spine makes a great deal of difference. Generally the children with higher level lesions have more problems. Children with mylomengencile have various problems which are related to mylomengencile. Each student may not have all of them but you will want to know about them because they are common in children with spina bifida.	
One major problem is muscle weakness in the lower part of the body. The higher the lesion the more complete the paralysis or muscle weakness will be.	
one possible problem is club feet	
another problem is lordosis, or sway back	
also scoliosis, or lateral or sideways curvature of the spine	
Sometimes the spinal curves can be corrected by jackets or braces.	
and different types of braces are available for weak legs	
a standing frame for young children another, called a paropodium	
These can be used with walkers which also vary according to the individual needs	
Different types of crutches are used. These are called fore arm crutches	
or canes. These are called 4 pt. canes some children work out best in a wheelchair	
and a few need only assistance in balance	
Because of these problems certain adaptations should be made in the classroom. Lowered boards,	
tables with "aprons" - where wheelchairs can go under	

Narrative	Slide

Bowel and bladder incontinence is a third problem. This can be managed in several ways.

Some children will be able to empty their bladders by pressing on the lower abdomen (Crede' maneuver) or through the use of a catheter. Others will wear diapers, towels, or other absorbent materials which are covered with plastic pants. A few ill combine some of these methods and be able to stay relatively dry all day.

Children with spina bifida will not necessarily have a bowel movement every day. Your student may be on a bowel training program at home where elimination is is controlled through use of enemas or drugs or other means.

Other children may have an ostomy, a surgically established method where waste material is diverted directly to the outside of the body through the abdominal wall. The opening (called a stoma) is covered by a waterproof bag (called an appliance) in which the material collects. The bag is attached to the skin by special glue and/or tape.

While this bag is changed at intervals (one to several days), the contents of the bag are drained through an opening provided for this purpose and thus the bag emptied. The opening in the bag is then tied or clipped tightly in order to keep the skin dry while more waste material collects. Emptying the bag can be done by the student himself, his parent, the teacher, or an aide. If a toilet is not available, a bowl (which is then emptied into the toilet) can be used.

One method of staying dry is fairly simple and is being used more and more. This is self or intermittent catherization.

Children are taught to pass a small catheter into the bladder several times each day to empty the urine. The catheter can be carried in a small container filled with antiseptic solution, or the child may merely wash the catheter with ordinary tap water before each use. If the child still leaks urine, one of the bladder medications which prevent bladder contractions may be used to keep the child dry between catheterizatons.

It is important for the teacher to realize that management of the problems related to the bowel and bladder incontinence of the spina bifida child is highly individualized. Detailed information, when necessary, should be obtained through the student and his family.

Narrative	Slide
A large number of children with myelomeningocele have hydrocephalus, a condition which occurs when an abnormal amount of spinal fluid accumulates within the brain.	
A surgical procedure is performed in order to prevent fluid buildup. In this procedure a tube with a valve is inserted under the skin leading from the brain ventricles to the heart or abdomen.	
You may have noticed a raised area behind the ear. No special care is needed but blows or pressure in this area should be avoided. The shunt may need revision in later years due to the growth of the child or malfunctioning and other factors.	
Children with hydrocephalus are more prone to have learning problems. Generally they fall into two groups, verbal and visual/perceptual.	
They maybe highly verbal, alert and friendly and appear to be much brighter than they actually are. Other areas of verbal weakness include auditory reception and auditory/vocal association	
Even more serious problems involve visual perception, and in particular, visuo-spatial relationships. Children with this problem have difficulty in understanding a shape and its relationship to the space surrounding it.	
It is important for the child with SB to have a thorough learning evaluation in order to determine which are the best teaching methods for him.	

MAJOR LEARNING DIFFICULTIES EXHIBITED BY SPINA BIFIDA CHILDREN

General Information:

Spina Bifida children need Special Education three times more often than "normal" children with 80% needing remedial education

Educational needs are influenced by:

1) Level of lesion
2) Presence of hydrocephalus and need for shunting
3) Hospitalization and preschool experiences

Intelligence

Average in 80's

On IQ tests lower scores on Eye-hand coordination, hand speed, comprehension, arithmetic, and visual perception

Major Areas of Difficulty:

1) **Sensory Integration Problems (80% of population)**
   - A) Dominance - late or not established
   - B) Hand weakness - ataxia, tremors, weakness
   - C) Motor Control - affecting force, direction and speed of movement
   - D) Problems crossing the midline
   - E) Poor kinesthetic and tactile feedback
   - F) Tactile defensiveness and postural insecurity

2) **Visual Perception** (Due to poor eye muscle control, brain damage, hydrocephalus, hospitalizations and lack of experience) Average 1-1/2 to 2-1/2 years below chronological age
   - A) Eye tracking problems
   - B) Spatial Discrimination problems
   - C) Figure ground problems
   - D) Copying

3) **Organizational Problems**

4) Language difficulties
   (Cocktail personality can camouflage weaknesses)
   - A) Auditory decoding and auditory association problems
   - B) Use of inappropriate and bizarre language
   - C) Reasoning and Comprehension difficulty

5) Reading Problems
   Lag on average 18-30 months below chronological age - Problems in content and comprehension

6) Math Difficulties

7) Handwriting problems

EC 140 353

Location of Meningomyelocele

	Thoracic-Lumbar	Lumbar	Lumbo-Sacral	Sacral
Ambulation	chairbound	chairbound	crutches	walk unassisted
Paralysis	severe	intermediate	intermediate	mild
Scoliosis	33%	20%	12%	3%
Incontinence	77%	59%	71%	80%
Hydrocephalus	86-100%	86-100%	74%	30%
Intelligence	low educable retarded	educable retarded	low average	close to normal
Education	special school	special school	special school -mainstreaming	more likely to attend regular school
Reading Ability	highest % nonreaders (76%)	50% nonreaders	40% nonreaders	highest % of readers

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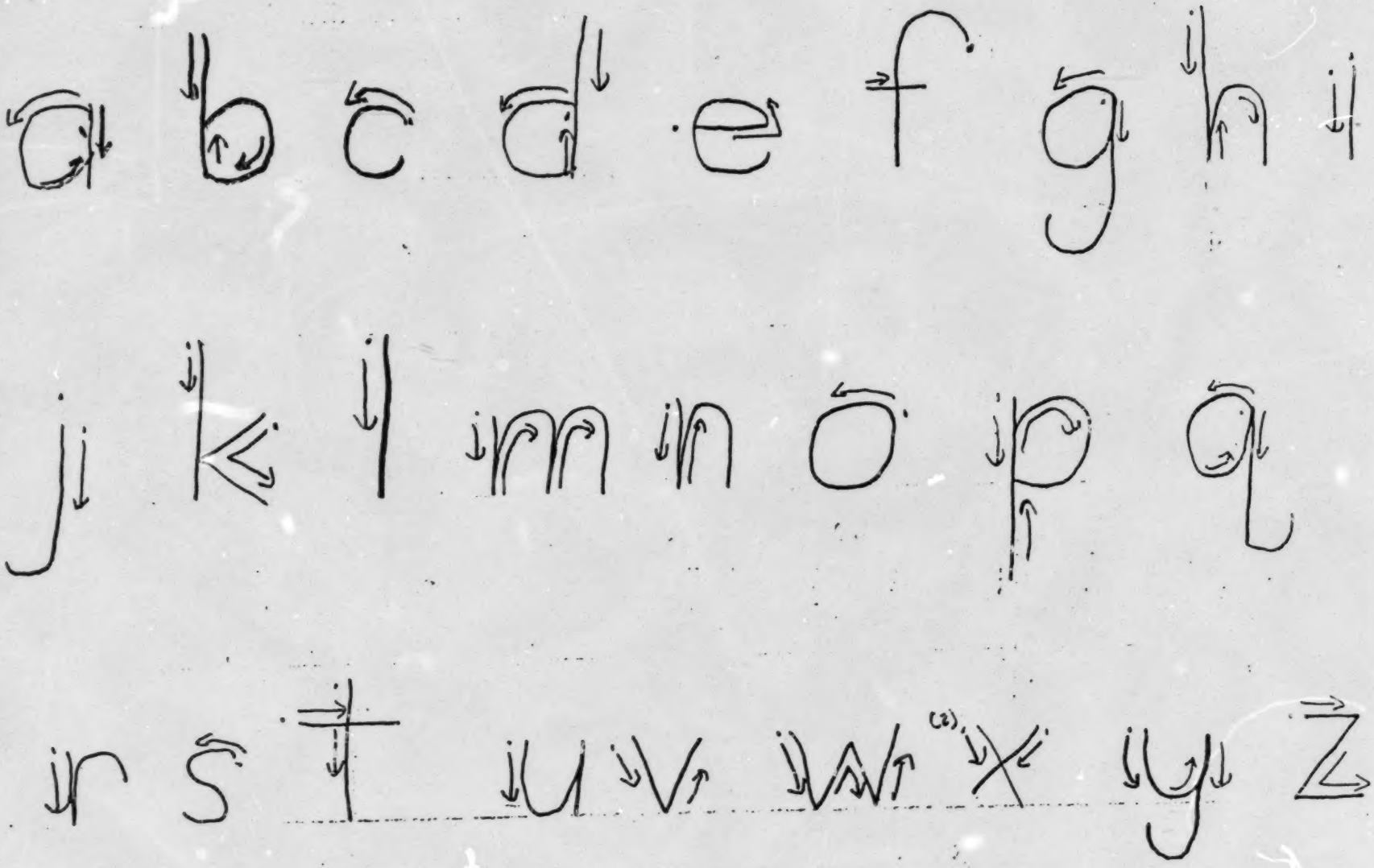

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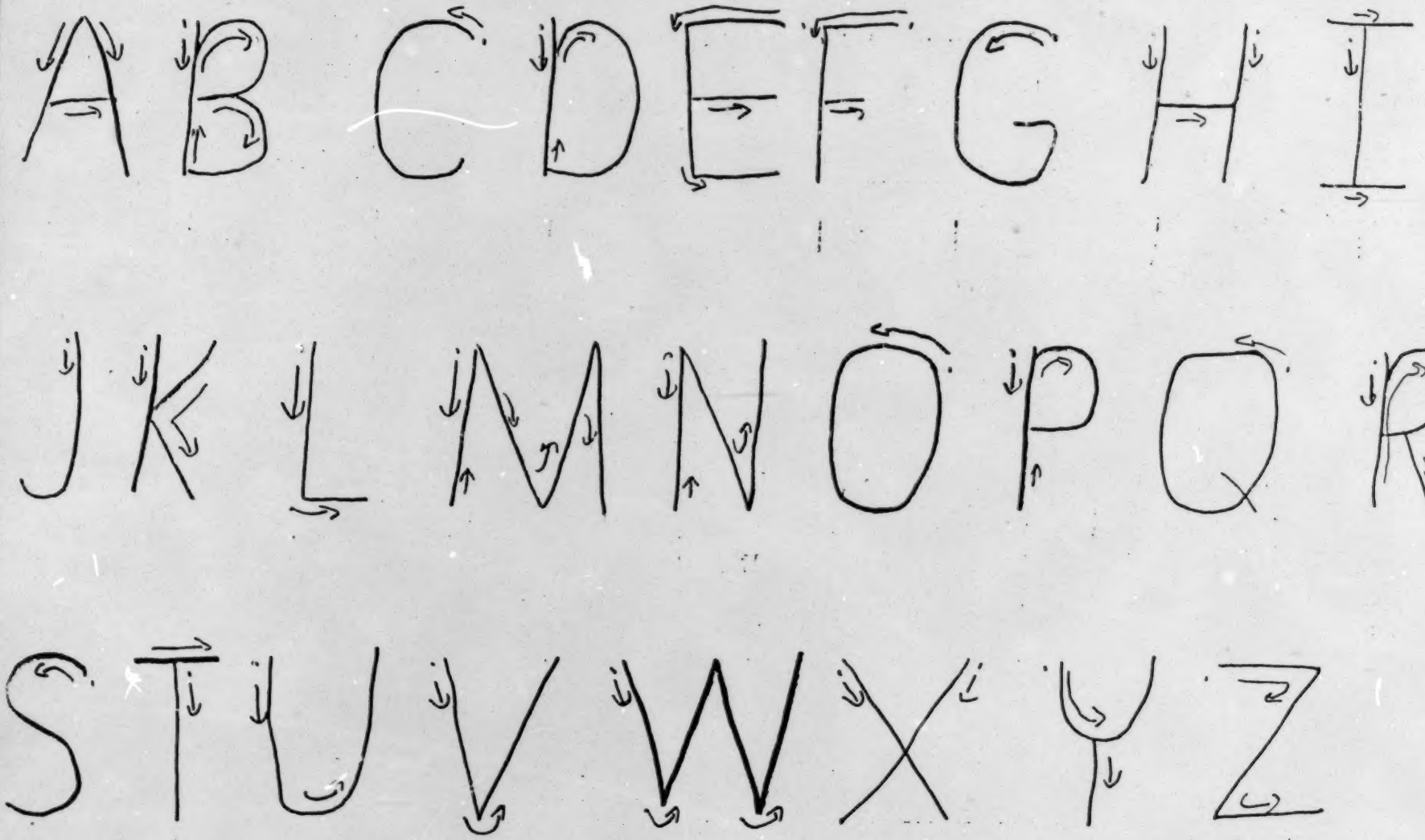

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A magazine whch deals with the kinds of problems faced by all parents of disabled children. In addition to articles filled with practical information, it presents a lively f for an exchange of parents' ideas and experiences.

39. We Did It -- So Can You! A teacher training program for mainstreaming handicapped children into the classroom, featuring the actual school experience of ten special students. By Workshop Films. Distributed by: Selective Educational Equipment, Inc., 3 Bridge Street, Newton, Massachusetts, o2195.

40. Travis, G, "Chapter 17. Spina Bifida: Myelomeningocele Form." In Chronic Illness in Children: Its Impact on Child and Family. Stanford: Stanford University Press, pp. 455-81, 1976.

M.E.T.P. Staff has additional references which are rather technical in nature pertaining to surgical procedures, deformities, urological aspects.